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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/645,773	08/21/2003	Hidehiko Kawaguchi	KAMMON 3.0-069 CONT	8770
530 7590 06/28/2006 LERNER, DAVID, LITTENBERG, KRUMHOLZ & MENTLIK 600 SOUTH AVENUE WEST WESTFIELD, NJ 07090			EXAMINER CARRILLO, BIBI SHARIDAN	
			ART UNIT 1746	PAPER NUMBER

DATE MAILED: 06/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/645,773

Applicant(s)

KAWAGUCHI ET AL.

Examiner

Sharidan Carrillo

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,5-8,12 and 15-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,2,5-8,12 and 15-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 19 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 19 is indefinite because of the recitation of "xcm". Based on claim 14 and the specification on page 10, the resistivity should be measured as ".cm".

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-2, 4, 8, and 17-18 are rejected under 35 U.S.C. 102(b) as being anticipated by King (4599116).

King teaches a method of employing an aqueous alkaline cleaner for cleaning of aluminum container surfaces. King teaches that it is desirable to subsequently rinse an alkaline cleaned surface with an aqueous based neutral or acidulated rinse solution at a controlled pH to remove residual cleaning solution there from where after it is subjected to further treatments as may be desired or required. In order to avoid any buildup in

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alkalinity, it is been found necessary to effect an overflow of the rinse and or a neutralization of alkaline buildup such as by the addition of an acid to maintain the pH of the rinse solution at a pH about 7. By maintaining the subsequent water rinse solutions at a neutral or acid pH, the formation of brown stains on the aluminum container bodies is substantially eliminated (col. 7, lines 15-37, col. 12, lines 1-12). Example 4 teaches continuous rinses in a pilot washer. In col. 6, lines 50-51 teach contacting of the substrate by immersion. The limitations of producing of salt would inherently be met by the teachings of King since King teaches performing the same method steps. Additionally, it is notoriously well known in the art that salts are produced by acid-base reactions (6759184, 6489353). In reference to claims 2 and 4, refer to col. 7, lines 20-30. In reference to claims 17-18, King teaches in col. 12, lines 5-10 of adding an amount of acidic component to the rinse solution.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.

4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).
8. Claims 1-2, 5-8, 12, and 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Olesen et al. (5656097).

Olesen et al. teach a wafer cleaning system. Olsen teach a cleaning tank subjected to sequential flows of one or more diluted cleaning solutions that are injected from the lower end of tank and allowed to overflow to the upper end. Olesen et al. teach cleaning with ammonium hydroxide/hydrogen peroxide/ water, followed by rinsing with cold DI water (col. 4, lines 1-20). Olesen teaches injecting small amount of HF into cold DI water stream (col. 4, lines 45-50) to create the desired concentration of HF for etching (col. 11, lines 45-55). In reference to claims 1, 7-8, and 15, Olesen teaches cleaning with ammonium hydroxide/hydrogen peroxide/ water mixture, followed by rinsing with cold DI water. After a predetermined period of time, acid is added to the rinse bath . Col. 4, lines 17-18 teaches continuing the cold DI water flow. Olesen further teaches overflowing the cleaning solution to the overflow weir 17 and directing it

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to a drain 23. Olesen fails to teach forming a salt. However, one would reasonably expect a salt to be produced by reaction of the acid with the basic cleaning solution since it is notoriously well known in the art that salts are produced by acid/base reactions (6759184, 6489353). In reference to claim 2, Olesen teaches contacting the wafer with the HF diluted in cold DI water rinse. In reference to claims 5-6, and 12, Olesen teaches that it is conventional in the art to use SC1 and SC2 solutions in the semiconductor manufacturing process. In col. 9, lines 63-65, Olesen teaches Piranha cleaning using sulfuric acid/hydrogen peroxide mixture in combination with the ammonium hydroxide/hydrogen peroxide mixture. In reference to claim 16, it would have been obvious to a person of ordinary skill in the art to use the method of Olesen to clean LCD since Olesen teaches using the method to clean wafers and circuit devices. In reference to claims 17-18, Fig. 5 teaches a concentration of BOE.

9. Claims 13-14 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Olesen et al. (5656097) as applied to claims 1-2, 5-8, 12, and 15-18 as described in paragraph 6 above, and further in view of Kennison et al. (3898351).

Olesen et al. teach the invention substantially as claimed with the exception of the limitations of claims 13-14 and 19. Specifically, Olsen et al. fail to teach measuring the resistivity of the rinse bath to determine the completion of the rinsing. Kennison et al. teach cleaning substrates used in the fabrication of integrated circuits. In col. 3, lines 39-55, Kennison teaches measuring the resistivity in the rinse water in order to determine whether the rinse is adequate. Kennison further teaches setting a resistivity level, such as 12 megaohms, to assure completeness of the rinse. It would have been

obvious to a person of ordinary skill in the art to have modified the method of Olesen et al. to include, measuring the resistivity of the rinse bath, as taught by Kennison, for purposes of determining the completeness of the rinsing step.

Response to Arguments

10. Applicant argues that King focuses on the neutralization of the rinse water instead of neutralization of the cleaning chemical liquid.

Applicant's arguments are unpersuasive since King teaches rinsing with an aqueous based neutral or acidulated rinse solution to remove residual cleaning solution from the substrate. Since the cleaner is alkaline and King teaches rinsing with an acid solution, inherently the alkaline solution will be neutralized. Additionally, col. 7, lines 30-45 teaches the addition of the acidified rinse solution to neutralized the "alkaline buildup" which is generated by the alkaline cleaning solution. A neutral pH of 7, as described in col. 7, lines 30-35 teaches the neutralization of the alkaline cleaning solution by washing with an acidified rinse solution.

11. Applicant argues that King fails to teach pure water. Applicant's specification does not define "pure water". For example, what amount and type of contaminants present in water would result in water being classified as "pure"? How is pure water classified? By what standards is water considered "pure" and how is it measured? What is the level of impurity needed in order to classify water as pure?

12. Applicant argues that King fails to teach a single immersion rinse step. Applicant's claim is not limited to a single immersion rinse step because of the open-ended language of "comprising". Applicant's arguments are unpersuasive since King

teaches using a pilot washer for cleaning and rinsing the substrate. Additionally, multiple rinsing stages do not require multiple containers as argued by applicant. The limitations of "rinsing conducted using a single immersion step" is not commensurate in scope with the instantly claimed invention.

13. Applicant argues that King fails to teach the production of a salt. Applicant's arguments are unpersuasive since King performs the same steps as the instantly claimed invention, therefore, inherently a salt would be produced as a result of reaction with the acid and base. Additionally, as evidenced by the prior art (6759184, 6489353), salts are produced by acid/base reactions.

14. Applicant argues that Olesen fails to teach neutralizing the chemical liquid. Applicant specifically argues that HF introduced into the cold DI water removes native oxide, instead of neutralizing the VC1 solution used to clean the wafer. Applicant's arguments are unpersuasive for the following reasons. col. 14, lines 63-68 and col. 15, lines 1-26 teach that the cleaning chemical liquid (i.e. Vc1) has a pH of almost 10. The introduction of the BOE (i.e. HF) to the rinse reduces the pH since the BOE has a neutral pH. Additionally, col. 15, lines 1-20 teaches that the rinses reduces the Ph to about 7.6. Therefore, there is a drop in pH, as a result of rinsing and the pH is further lowered as a result of the BOE acid.

15. Applicant argues that Olesen fails to teach adding the neutralizing chemical liquid during continuous feeding of the pure water. Applicant argues that Olesen teaches adding HF, turning of f the supply of HF, then feeding the DI water rinse. Applicant's arguments are unpersuasive for the following reasons. For example, Fig. 4 of Olesen

teaches a low flow cold DI water stream and adding BOE during the time period of 5.5 to 6.5 min. Fig. 9 teaches a low flow cold DI water and adding BOE during the time period of 11.5-12.5 min. Additionally, col. 10, lines 55-60 teaches that during rinsing the manifold 20 is flushed with cold DI water to eliminate traces of chemicals that were added. Col. 11, lines 45-55 teaches injecting a small amount of HF/BOE into the cold DI flow into the manifold 20. Therefore, the examiner is interpreting the cold DI water stream as the rinse and the addition of HF, as the neutralizing chemical liquid added to the rinse.

16. Applicant argues that Olesen fails to teach "continuously feeding pure water to the rinse bath so as to rinse off the cleaning chemical liquid. Applicant argues that Olesen teaches quick dump and not continuously feeding the pure water to the bath. Applicant's arguments are not persuasive because col. 3, lines 35-45 teaches introducing cold DI water at a low flow rate to carry chemical and cause the tank to overflow. Col. 3, lines 50-54 teaches a continued low flow of DI water into the tank and its overflow at the top. Col. 10, lines 55-60 teaches flushing the manifold with cold DI water during rinsing to eliminate trace chemicals.

17. Applicant argues that Olesen fails to teach a single rinsing immersion step. Applicant's arguments are not persuasive because they are not commensurate in scope with the instantly claimed invention and because of the open-ended language of comprising. Additionally, Olesen teaches cleaning and rinsing in a single tank (col. 2, lines 65-68).


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sharidan Carrillo whose telephone number is 571-272-1297. The examiner can normally be reached on Monday-Friday, 6:00a.m-2:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on 571-272-1414. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sharidan Carrillo
Primary Examiner
Art Unit 1746

bsc



SHARIDAN CARRILLO
PRIMARY EXAMINER